UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/633,614	08/05/2003	Motohide Takeichi	106973.01	5380

25944 7590 04/22/2005

OLIFF & BERRIDGE, PLC
P.O. BOX 19928
ALEXANDRIA, VA 22320

EXAMINER	
CHANG, VICTOR S	
ART UNIT	**PAPER NUMBER**
1771	

DATE MAILED: 04/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/633,614	TAKEICHI ET AL.	
	Examiner	Art Unit	
	Victor S. Chang	1771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-6 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-6 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 09/631,280.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 8/5/2003.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. First paragraph of the application should include a cross-reference to related applications. A proper update is requested.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 3 and 5 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The compositions of the thermosetting resin and inorganic particles, and the height of the electrodes are critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

More particularly, in the absence of composition, the property recitation "a thermosetting resin which exhibits a viscosity of 500 cps or less at 100°C" is considered to be too broad and in excess of provided enablement in the Specification, since the property recitation purports to cover any conceivable combination of ingredients either presently existing or which might be discovered in future and which would impart desired characteristics, but are unobvious to the instantly claimed invention (i.e., in excess of provided enablement in the specification), and the recitation also appears to

read upon materials that could not possibly be used to form the contemplated genus or subgenus of articles. As a result, undue experimentation would be required to formulate suitable compositions for this claim or to determine what would or would not infringe. *Ex parte Slob* (PO BdApp) 157 USPQ 172.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 1 and 2, the absence of the ranges of the heights (h_1 and h_2) of electrodes renders the equations 3 and 4 indefinite, i.e., they are meaningless when the scope of the heights are unknown.

In claim 3, line 2, the recitation "a thermosetting resin which exhibits a viscosity of 500 cps or less at 100°C" is vague and indefinite, because it gives no notice as to what constitutes infringement upon the instantly claimed invention. It should be noted that claims merely setting forth physical characteristics desired in article, and not setting forth specific structure and/or compositions which would meet such characteristics, either in the claim or Specification, are invalid as vague, indefinite, and functional, since it recites compounds by what it is desired that they do rather than what they are. As such, it is unclear as to what is the scope of the invention of which Applicant intends to claim. *Ex parte Slob* (PO BdApp) 157 USPQ 172.

In claim 4, line 1, the term "conductive" is vague and indefinite. It is unclear to the Examiner which type of the conductivity is being claimed, i.e., does it mean "electrically conductive" or "thermally conductive"? Clarification is requested.

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 1, 2 and 4 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3 and 5 of U.S. Patent No. 6,514,433. Although the conflicting claims are not identical, they are not patentably distinct from each other, it is noted that both inventions claims the same subject matter of a thermosetting resin adhesive comprising conductive particles for connecting electrodes. The particle size of US '433 reads on the range of mean particle size of instant invention, and the volume percent of the particles in the resin of US '433 also reads on the instantly claimed invention. As such, while the US '433 does not explicitly claim the specific surface area of the particles, and the dimensional

relationship between the mean and maximum particle size to the heights of electrodes, it is the Examiner's position that, in the absence of evidence to the contrary, since both inventions claims the same subject matter, the aforementioned elements are either anticipated by, or are obviously provided by practicing the invention of US '433. It should be noted that where the claimed and prior art products are shown to be identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. See MPEP § 2112.01.

8. Claims 1, 2 and 4 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 2 and 4 of U.S. Patent No. 6,566,422. Although the conflicting claims are not identical, they are not patentably distinct from each other, it is noted that both inventions claims the same subject matter of a thermosetting resin adhesive comprising conductive particles for connecting electrodes. In particular, the particle size of US '422 reads on the range of mean particle size of instant invention, and the volume percent of the particles in the resin of US '422 also reads on the instantly claimed invention. As such, while the US '422 does not explicitly claim the specific surface area of the particles, and the dimensional relationship between the mean and maximum particle size to the heights of electrodes, it is the Examiner's position that, in the absence of evidence to the contrary, since both inventions claims the same subject matter, the aforementioned elements are either anticipated by, or are obviously provided by practicing the invention of US '422.

9. Claims 1, 2 and 4 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 4, 5 and 8 of U.S. Patent No. 6,451,875. Although the conflicting claims are not identical, they are not patentably distinct from each other, it is noted that both inventions claims the same subject matter of a thermosetting resin adhesive comprising conductive particles for connecting electrodes. In particular, US '875 claims that the average particle size of the particles is at least 1.5 times the recessed depth of the electrodes from the outer face of the passivation layer on the semiconductor element. While the US '422 does not explicitly claim the specific surface area of the particles, and the dimensional relationship between the mean and maximum particle size to the heights of electrodes, it is the Examiner's position that, in the absence of evidence to the contrary, since both inventions claims the same subject matter, the aforementioned elements are either anticipated by, or are obviously provided by practicing the invention of US '875.

10. Claims 1, 2 and 4 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 2, 6 and 7 of U.S. Patent No. 6,673,858. Although the conflicting claims are not identical, they are not patentably distinct from each other, it is noted that both inventions claims the same subject matter of a thermosetting resin adhesive comprising conductive particles for connecting electrodes. In particular, the volume percent of the particles in the adhesive of US '858 reads on the range of volume percent of instant invention. As such, while the US '858 does not explicitly claim the specific surface area of the particles, the dimensional relationship between the mean and maximum particle size to the heights of

electrodes, and the mean particle size, it is the Examiner's position that, in the absence of evidence to the contrary, since both inventions claims the same subject matter, the aforementioned elements are either anticipated by, or are obviously provided by practicing the invention of US '858.

11. Claims 1, 2 and 4 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 2 of U.S. Patent No. 6,426,021. Although the conflicting claims are not identical, they are not patentably distinct from each other, it is noted that both inventions claims the same subject matter of a thermosetting resin adhesive comprising conductive particles for connecting electrodes. In particular, the particle size of US '021 reads on the range of mean particle size of instant invention. As such, while the US '021 does not explicitly claim the specific surface area of the particles, the dimensional relationship between the mean and maximum particle size to the heights of electrodes, and the volume percent of the particle in the adhesive, it is the Examiner's position that, in the absence of evidence to the contrary, since both inventions claims the same subject matter, the aforementioned elements are either anticipated by, or are obviously provided by practicing the invention of US '021.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. Claims 1-6 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Shiobara et al. (US 6083774).

Shiobara's invention is directed to mounting a semiconductor chip on a circuit substrate. The space between the semiconductor chip and the circuit substrate is sealed with an encapsulating resin composition in molten state. The composition contains (a) an epoxy resin, (b) a curing agent, and (c) an inorganic filler (i.e., a thermosetting resin with an inorganic filler) (Abstract). The inorganic filler has a mean particle size from 1 to 15 μm, more desirably 2 to 10 μm; the maximum particle size is up to 24 μm, more desirably up to 20 μm, most desirably up to 10 μm; and the specific surface area (BET adsorption method) is 3.5 to 6.0 m^2/g. In one example of using fused silica or alumina as the inorganic filler, the amount of fused silica or alumina used is preferably 100 to 550 parts, more preferably 200 to 450 parts by weight per 100 parts by weight of the epoxy resin and the curing agent combined. Less than 100 parts of fused silica or alumina would be too small to fully reduce the coefficient of expansion

whereas compositions containing more than 550 parts of fused silica or alumina would become too viscous to mold.

For claims 1, 2 and 6, Shiobara is silent about the dimensional relationship between the mean and maximum particle size to the heights of electrodes; and the volume percent of the inorganic filler. However, since Shiobara does teach the same subject matter (a curable resin with inorganic filler) for the same application (mounting semiconductor chip to a circuit board) as the instant invention, and also expressly teaches the ranges of mean and maximum particle sizes, and the amount of filler in terms of weight percentage, as set forth above, it is the Examiner's position that, in the absence of evidence to the contrary, a suitable dimensional relationship between particle sizes and heights of electrodes, and a suitable amount of inorganic filler in terms of volume are either anticipated by Shiobara, or are obviously provided by practicing the invention of prior art.

Similarly, for claim 3, while Shiobara is silent about the viscosity of the thermosetting resin at 100°C, Shiobara does teach the same type of thermosetting resin such as a epoxy resin, as set forth above, as the instant invention (see specification, page 9, line 1), and also teaches that the composition has a melt viscosity of up to 200 poises at the molding temperature (abstract); further, if the temperature is below 130°C, the encapsulating resin composition would have a higher melt viscosity so that the resin can sweep away solder bumps during molding or allow voids to be left in the interior; if the mold temperature is above 200°C, rapid reaction can result in short-filling. Clearly, Shiobara is fully aware of the requirements of a suitable viscosity. As such, since

Shiobara teaches the same subject matter (in particular, the same type of adhesive, e.g., epoxy) as the instant invention, it is the Examiner's position that, in the absence of evidence to the contrary, a suitable viscosity of the thermosetting resin at 100°C is also either anticipated, or obviously provided by practicing the invention of prior art.

For claim 4, Shiobara expressly teaches that the inorganic filler provides an improved heat conductivity (column 6, lines 15-29).

For claim 5, while Shiobara is silent about the coefficient of moisture absorption of the adhesive composition, Shiobara does teach that the resulting semiconductor device has improved moisture resistance and reliability (column 1, lines 45-46), and shows the improvement in a comparative study (column 11, lines 35-65). As such, since Shiobara teaches the same subject matter (an improved moisture resistance) as the instant invention, it is the Examiner's position that, in the absence of evidence to the contrary, a suitable coefficient of moisture absorption is also either anticipated, or obviously provided by practicing the invention of prior art.

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor S. Chang whose telephone number is 571-272-1474. The examiner can normally be reached on 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel H. Morris can be reached on 571-272-1478. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Victor S Chang
Examiner
Art Unit 1771

4/13/2005